Document ID: 1545
Revision ID: REV 0
Effective Date: 12/14/00

Engineering Design File 1545

Staging, Storage, Sizing, and Treatment Facility (SSSTF)

Waste Staging and Storage Criteria

[The following statement is optional:
Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho]

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Form 412.14
10/05/99
Rev. 02

ENGINEERING DESIGN FILE

1. Project File No.: 020996 2. Project/Task: SSSTF

3. Subtask: Staging, Storage, Sizing, and Treatment Facility (SSSTF), Waste Staging and Storage Criteria

4. Title: SSSTF Waste Staging and Storage Criteria

5. Summary:

This Engineering Design File (EDF) presents the resulting staging and storage requirements based on the findings of other EDF's for the above referenced project/task:
The specific hold points (either staging or storage as defined in the following documentation) have been determined and include contingency areas provided where deemed necessary. The best method for accomplishing the required storage has been determined in combination with regulatory guidelines, historical data, and best engineering judgement.

The Staging, Storage, Sizing, and Treatment Facility (SSSTF) will process Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) generated waste. The SSSTF will provide staging and storage where identified within the process flow. Contingencies have been provided for wastes not specifically characterized to date, but that has a high probability of existence and will likely come to the SSSTF.

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Distribution (summary package only):

7. Review (R) and Approval (A) Signatures
(Minimum reviews and approvals are listed. Additional reviews/approvals may be added.)

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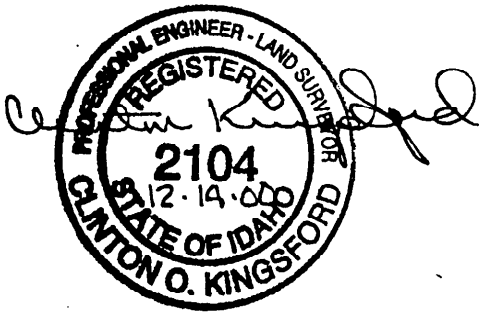

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ACRONYMS

AOC	Area of Contamination
BFD	Block Flow Diagram
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EDF	Engineering Design File
EP	evaporation pond
ERDF	Environmental Restoration Disposal Facility
ICDF	INEEL CERCLA Disposal Facility
IDW	Investigative Derived Waste
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LDR	Land Disposal Restriction
OU	Operable Unit
PCB	Polychlorinated Biphenyl
ppm	Parts per Million
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
ROD	Record of Decision
RO/RO	Roll-on/Roll-off (containers)
SRPA	Snake River Plain Aquifer
SSA	Staging and Storage Annex
SSSTF	Staging, Storage, Sizing, and Treatment Facility
SWPPP	Storm Water Pollution Prevention Plan

T&FR	Technical and Functional Requirements
TCLP	Toxicity Characteristic Leaching Procedure
TRU	transuranic
TSCA	Toxic Substance Control Act
WAC	Waste Acceptance Criteria
WAG	Waste Area Group
WGS	Waste Generator Services

Staging, Storage, Sizing, and Treatment Facility (SSSTF) Waste Staging and Storage Criteria

1. INTRODUCTION

The U.S. Department of Energy Idaho Operations Office (DOE-ID) authorized a remedial design/remedial action (RD/RA) for the Idaho Nuclear Technology and Engineering Center (INTEC) in accordance with the Waste Area Group (WAG) 3, Operable Unit (OU) 3-13 Record of Decision (ROD).[1]

The ROD requires Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remediation wastes generated within the Idaho National Engineering and Environmental Laboratory (INEEL) boundaries to be removed and disposed of on-site in the INEEL CERCLA Disposal Facility (ICDF). The ICDF, which will be located south of INTEC and adjacent to the existing percolation ponds, will be an on-site, engineered facility, meeting DOE Order 435.1, Resource Conservation and Recovery Act (RCRA) Subtitle C, and Toxic Substances Control Act (TSCA) polychlorinated biphenyl (PCB) landfill design and construction requirements. The ICDF will include the necessary subsystems and support facilities to provide a complete waste disposal system.

The major components of the ICDF are the disposal cells, an evaporation pond, and the Staging, Storage, Sizing, and Treatment Facility (SSSTF). The disposal cells, including a buffer zone, will cover approximately 40 acres, with a disposal capacity of about 510,000 yd^3. Current projections of INEEL-wide CERCLA waste volumes total about 483,800 yd^3 DOE Order 435.1. The SSSTF will be designed to provide centralized receiving, inspection, and treatment necessary to stage, store, and treat incoming waste from various INEEL CERCLA remediation sites prior to disposal in the ICDF, or shipment off-site. All SSSTF activities shall take place within the WAG 3 area of contamination (AOC) to allow flexibility in managing the consolidation and remediation of wastes without triggering Land Disposal Restrictions (LDRs) and other RCRA requirements, in accordance with the OU 3-13 ROD. Only low-level, mixed low-level, hazardous, and limited quantities of TSCA wastes will be treated and/or disposed of at the ICDF. Most of the waste will be contaminated soil, but debris and Investigative Derived Waste (IDW) will also be included in the waste inventory. ICDF leachate, decontamination water, and water from CERCLA well purging, sampling, and well development activities will also be disposed of in the ICDF evaporation pond.

Only INEEL on-site CERCLA wastes meeting the agency approved Waste Acceptance Criteria (WAC) will be accepted at the ICDF. An important objective of the WAC will be to ensure that hazardous substances disposed in the ICDF will not result in exceeding groundwater quality standards in the underlying groundwater aquifer. Acceptance criteria will include restrictions on contaminant concentrations based on groundwater modeling results with the goal of preventing potential future risk to the Snake River Plain Aquifer (SRPA).

This Engineering Design File (EDF) will identify potential holding points, either staging or storage, which may be required throughout the process. The mission of the SSSTF is to process all incoming wastes as quickly as possible. It is projected that 92% of the waste will go directly to the ICDF landfill and will require little time for processing. Eight percent (8%) of the waste will need to be treated or handled as special case waste. The major facilities are:

- Open air holding pads for either full or empty enclosed waste containers
- Scales to weigh trucks

- Small modular building to temporarily hold waste with PCBs >50 ppm.

The SSSTF will be located adjacent to and west of the INTEC and south of the INTEC Electrical Substation 2. This location will facilitate ease of providing service utilities necessary to the function of the ICDF Complex. The ICDF landfill will be located south of the SSSTF and the evaporation pond (EP) will be located southeast of the SSSTF. See Appendix A for site area map showing the locations of the various facilities.

The SSSTF will process CERCLA-generated waste from all of the INEEL WAGs. The wastes that will be processed through the SSSTF are identified in the Waste Inventory Design Basis, EDF 1540.[2] All wastes will be processed through the SSSTF. From the SSSTF all wastes will be dispostioned to either:

- Go directly to the landfill
- Be treated and then sent to the landfill
- Go directly to the EP.
- If the waste cannot be treated to meet the ICDF WAC, it may be treated and/or repackaged and then sent to another facility either on the INEEL site or off-site to another disposal facility.

2. PROCESS DESCRIPTION

2.1 Hold Points

This EDF presents the resulting staging and storage requirements based on the findings of the following EDF's for the above referenced project/task:

EDF	(1540)	"Waste Inventory Design Basis" [2]
EDF	(1542)	"Stabilization and Treatment Process Selection"[3]
EDF	(1543)	"Waste Transport Study"[4]
EDF	(1544)	"Waste Verification and Statistical Analysis"[5]
EDF	ER-226	"Preliminary Hazard Catergorization of the INEEL Operable Unit 3-13 Waste Disposal Complex (includes ICDF Landfill, Evaporation Pond, and SSSTF)"[6]
EDF	(1546)	"Preliminary Hazard Classification Analysis" (Ref: EDF-ER-226)[7]
EDF	(1547)	"SSSTF/ICDF Operational Scenarios and Process Flows"[8]
EDF	(1548)	"Siting Study"[9]
EDF	(1549)	"Evaporation Pond Waste Acceptance Criteria (WAC) Basis and Aqueous Waste"[10]
EDF	(1551)	"Waste Acceptance Criteria"[11]

The specific hold points have been determined based on the function of the activities identified in the Process Flow Studies of EDF 1547, "SSSTF/ICDF Operational Scenarios and Process Flows" (see Reference 8). The best method for accomplishing the staging needs has been determined in combination with regulatory guidelines, historical data, and best engineering judgement.

Appendix B is a block flow diagram and shows the process flow of waste from the entrance and through the SSSTF to the landfill. Appendix A is a site area map of the SSSTF, which shows the layout of the proposed facilities. A general description of flow of waste through the SSSTF is as follows:

- The access to the SSSTF facility will be controlled with perimeter fence and access/egress gates. Upon entering the fenced area, paperwork shipped with a load of waste will be checked and verified, the load will be weighed and if necessary will be parked in a holding area. Samples of the waste will not be taken at this point.

- Waste not matching the profile and criteria will be held until proper disposition is determined.

- Upon verification, the load of waste will be taken directly to the landfill if treatment is not required, or to the treatment facility if treatment is required. A concrete staging pad will be provided for waste that cannot be treated immediately.

- Based on the waste characteristics, approximately 92% of the waste defined in EDF 1540 (see Reference 2) will be taken directly to the ICDF landfill and disposed of. The remaining 8% will be taken to the treatment facility for treatment or handled as special case.

- The waste to be treated will be taken to the treatment facility. See EDF 1542 (see Reference 3) for a discussion of the treatment facility.

- After treatment, the treated waste will then be placed in roll-on/roll-off (RO/RO) containers and allowed to cure. The treated waste will then be sampled. Samples will be sent to the laboratory for Toxicity Characteristic Leaching Procedure (TCLP) testing. All of the treated loads will be held in an outside storage area while waiting for the sample test results.

- Waste passing the TCLP will be hauled to and disposed of in the landfill. Waste which does not pass the TCLP will be returned to the treatment facility for additional treatment and stabilization.

- From the landfill, the truck with the empty container will return to the SSSTF. The truck will go through the decontamination facility for cleaning if contamination is found on the truck exiting the landfill.

- From the decontamination facility, the truck will be reweighed on the scales to obtain the tare weight and then be allowed to return to the waste generator site.

2.2 Contingency Storage

As shown on the area map (see Appendix A) various staging areas are being provided to accommodate the movement of waste through the SSSTF facility. The sizes of these pads are also shown on the site area map in Appendix A. There will be room for 28 – 13 yd^3 RO/RO containers in the northwest side of the facility. Based on the projected flow rate of 6-13 yd^3 RO/RO containers per day (See EDF 1547, Reference 8), there will be room enough for four days of waste plus four additional

containers. This amount of storage was based on a project decision and best engineering judgment. This area will be used as a contingency storage in the event the waste cannot be treated as it arrives at the facility.

The second staging area will hold (42) 13 yd^3 RO/RO containers. This area will be located near the southwest side of the facility. Treated waste will be stored here to wait the test results from the TCLP samples. This area will provide for six days of storage assuming the treatment of six RO/RO containers per day. This will also provide six additional spaces for contingency storage.

The third staging area will be located towards the north perimeter fence to be used for empty containers or additional contingency storage. There will be room for 20 RO/RO containers in this area.

From the Waste Inventory in EDF 1540 (see Reference 2), the highest concentration of PCBs is 23 ppm and can be disposed in the ICDF. However, a small self-contained storage building will be reserved for waste with PCBs greater than 50 ppm if waste with this concentration should come to the SSSTF. This building will be in compliance with the TSCA as defined in 40 CFR 761 for PCBs. From here, the PCB waste will be packaged and held temporally for the Waste Generator Services (WGS) repossession and final disposition either onsite or to an off-site facility.

3. DESIGN BASIS

3.1 Requirements

Technical and Functional Requirements (T&FR's) directly related to the staging and storage of waste in the SSSTF have been consolidated and are shown in Appendix C. The T&FR's in conjunction with the results of the referenced EDF's were utilized to form the basis for the identification of staging and storage requirements.

3.2 Assumptions

Wherever clarification by requirement or basis was not available, assumptions were made in conjunction with "best engineering judgement." As information becomes available, and these assumptions become better defined, the design basis will be refined.

1. The proceeding requirements are based on the waste volumes to be processed as defined in EDF 1540, "Waste Inventory Design Basis" (see Reference 2).

2. It is assumed that transuranic constituents in the waste which cannot be treated to below 10 nCi/gm will be packaged and temporarily held to wait disposition to an acceptable treatment facility either on the INEEL or to an off-site location.

3. The SSA is the area for staging waste having transuranic (TRU) constituents with a rad concentration >10 nCi/gm. This waste will be staged here for final disposition.

4. The identified 60 m^3 (79 yd^3) of OU3-14 Investigative Derived Waste (IDW) will be stored at the SSA until final disposition is determined (see Reference 2).

5. After weighing, loads of waste will be parked in a holding area inside the fence at the SSSTF. The waste profile data form will be checked. Assuming everything is in order, the load will proceed either to the ICDF landfill or to the treatment facility. No sampling of the waste will take place at this location.

6. It is assumed that no trucks coming into the SSSTF will have to be decontaminated. However, it is assumed that 5% of the trucks coming from the ICDF landfill will have to be decontaminated. The intent is to operate the landfill in such a manner so there will be no contamination, but provision is being made for decontamination of trucks and equipment should it be necessary. The decontamination water will be collected in a lift station and pumped directly to the evaporation pond. This is based on similar operations of existing facilities including Environmental Restoration Disposal Facility (ERDF) at Hanford and Envirosafe at Mountain Home, Idaho.

7. It is assumed that CERCLA waste being held or passing through the SSSTF will be adequately contained. Special containment features will be provided for special waste such as PCBs > 50 ppm.

8. Storm water from uncontaminated areas in the SSSTF will be discharged in accordance with the INEEL Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities (DOE/ID-10425) and the INEEL Storm Water Pollution Prevention Plan for Industrial Activities (DOE/ID-10431). Storm water will be drained away from facility structures to property adjacent to the SSSTF. This storm water will require no treatment and will not be sent to the EP.

9. After treatment, the treated waste may be staged at the SSSTF and sampled. A TCLP analysis will then be run on the sample to verify that the stabilization is correct. The testing will be done at an INEEL laboratory. It is assumed that it will take three days for test results to be returned. However, a six day storage area will be provided at the SSSTF with room for another six containers as a contingency staging area. Assuming the use of RO/RO containers, an area for 42 containers is being provided. This will give six days of storage, plus six spaces for contingency storage. (See the site area map in Appendix A)

10. It is assumed that the validation samples will be placed in the Landfill along with the associated sampled load of treated waste.

11. The ROD (see Reference 1) designates the ICDF EP as a component of the Corrective Action Management Unit (CAMU). Aqueous waste disposed of in the CAMU does not have to meet the LDRs. In addition, aqueous waste generated from within the WAG 3 AOC can be disposed of within the EP also without meeting the LDRs.

12. Decontamination from the decontamination building water will be pumped directly to the evaporation pond for disposal.

13. It is assumed that purge/development water generated prior to the construction and operation of the SSSTF facility will need to be stored. The Staging and Storage Annex (SSA) will facilitate storage of purge/development water until the ICDF EP is put into operation and will be able to accommodate the continued storage of purge/development water throughout operation of the SSSTF. After the EP has been constructed, aqueous wastewater will be trucked to the SSSTF. The waste profile paperwork will be processed and the water will be transported to the EP for disposal. There will be no treatment of this aqueous waste in the SSSTF.

14. It is assumed that the generators of all waste will be responsible for sampling, testing, writing waste profiles, containerizing, and transporting their waste in compliance with the WAC for the SSSTF and ICDF. The projected delivery schedules from the WAGs for non-

aqueous and aqueous wastes are referenced in EDF 1547 (see Reference 8); however, the waste load averaging identified in EDF 1547 will alter the projected delivery schedule.

15. The SSA will become part of the overall ICDF Complex when the complex begins operation.

16. The ICDF will be in operation during a nine (9) month period from March through November. The SSSTF is projected to be operational 12 months. SSSTF activities during the three-month closure of the ICDF will include routine maintenance, treatment and/or repackaging of the wastes not going to the ICDF, etc.

17. It is assumed at this point there will be three (3) wastes streams of concern which will require special handling and will not be disposed of in the landfill:

    a. Waste containing TRU constituents $\geq$ 10 nCi/gm

    b. PCBs >50 ppm

    c. Special Case Waste. Special Case Waste is waste that exceeds the WAC but might be able to be treated under special conditions, such as low volume anomalous waste.

18. The waste inventory does not reflect any organics requiring treatment; therefore, no staging or storage will be provided for effluents or solids that would be associated with an organic treatment process.

19. The SSSTF will not provide laboratory and analysis capabilities. It is assumed that all sampling and analysis can be accomplished by other facilities within the INEEL.

20. The main type of vehicle to be used to transport the waste to the SSSTF and from the SSSTF to the landfill will be a hoist truck to load and unload RO/RO containers. In special cases flat bed trucks may be used for transporting barrels and super sacks. End dump trucks lined with plastic will also be allowed. Tank trucks will be used to transport aqueous waste. (See EDF 1543, "Waste Transport Study," see Reference 4.)

4. FACILITY DESCRIPTION

The SSSTF will stage, store, size, and treat all CERCLA waste from all WAGs. Through this process, the waste will be prepared for disposal in the ICDF landfill or evaporation pond. The layout of the SSSTF is shown on the site layout drawing in Appendix A. The SSA is currently functioning and is located inside the INTEC facility.

The SSA will provide storage for boxed soils and aqueous wastes collected prior to the activation of the SSSTF. The SSA will be incorporated into the overall SSSTF facility when the SSSTF comes on-line and will continue to provide storage as needed for all aqueous wastes and containerized non-aqueous wastes.

Hold points satisfying specific needs associated with activities throughout the process flow have been identified in the Block Flow Diagram in Appendix B and are described in the following section.

4.1 Physical Architectural Description of the SSSTF

Following is a description of the various hold points throughout the SSSTF facility:

The circled numbers identified on the Block Flow Diagram, Figure 1 in Appendix B, are associated with the descriptions below and coordinate with the hold points on the diagram. An area map, in Appendix A, shows the location of these facilities.

1-Holding Area – 10 truck capacity

An unenclosed area will be located inside the SSSTF fence and south of the administration building. The area will be located near the entry gate to the SSSTF Facility. The area will be in a paved area to accommodate parking of transport vehicles during paper verification and initial visual inspection. A rad survey of the exterior of the vehicle could be performed at this location if it is deemed necessary.

2-Staging Area (28 RO/RO containers) for Treatment of Waste

A staging area will be provided for twenty-eight RO/RO containers prior to treatment. This is based on 4 days of storage for 6 RO/RO containers per day with 4 additional spaces for contingency. The pad will be constructed with 10 in. of reinforced concrete. The reinforced concrete will attenuate the abrasion from the RO/RO containers. No curbed pad containment, sealed surface, or a physically separate structure for this holding area will be provided. This area is being provided in the event the waste containers cannot be immediately dumped into the treatment building. See the site layout map in Appendix A for the location and the size of this area.

3-Waste Storage area for Special Case Waste

Special case waste is any waste that cannot be routinely processed in the SSSTF and requires special handling or treatment procedures. Any special case waste, which is received at the SSSTF, will be evaluated for treatment and onsite disposal or repackaged if required for off-site disposal. This waste will then be shipped to another location for final disposal. A small area in the treatment building is being designated for repackaging of special case waste. No storage will be provided in the treatment building.

4-Contingency Storage of PCBs > 50 ppm

An enclosed and separate modular storage facility, which is TSCA compliant, will be provided with controlled environment to meet the regulatory requirements in the event that waste with PCBs come to the SSSTF with concentrations greater than 50 ppm. A facility large enough for one RO/RO container is proposed.

5-Material Unloading Station

The individual reagents required to feed into the stabilization of the wastes being treated will be stored in silos, bins, or equivalent storage means. These will be located in close proximity to the mixing process and accommodate the ease of servicing and supplying reagents into the mixing process.

6-Contaminated Equipment Storage

A reinforced concrete storage pad will be provided for contaminated equipment waiting for disposition. The pad will be sloped to a sump, which will collect any water. The water will be pumped to the EP. See the site layout map in Appendix A for the location and the size of this area.

7-Empty Container Storage

A storage area will be provided on the northwest side of the facility where empty RO/ROs brought from the landfill can be placed. The empty containers will be placed here temporarily until they are picked up by trucks to take them to a waste generator site or used for treated waste. See the site layout map in Appendix A for the location and the size of this area.

8-Curing and Holding (RO/RO containers) – Treated Waste

A reinforced concrete pad will be provided near the treatment building. This pad will be used to stage forty two (42) containers holding treated waste while waiting for test results from TCLP samples. This will provide six (6) days of storage of treated waste based on 6 RO/RO containers per day. In addition there will be six (6) additional staging spaces for contingency purposes. See the site layout map in Appendix A for the location and the size of this area.

4.2 Utilities

All necessary utilities will be provided to service the needs of the SSSTF process areas including potable, fire and raw water, electrical, communications, and alarm facilities.

4.3 Instrumentation

Instrumentation will be provided as needed throughout the SSSTF facility where operations require. For example, the receiving area will require a scale for weighing the vehicles entering and exiting the SSSTF. These scales will be 10 ft by 70 ft and will have a capacity of 50 tons with an accuracy within 100 lbs at full scale. Instrumentation will be provided with the scales so that the weighing data can be received and documented within the administration building.

5. REFERENCES

1. U.S. Department of Energy Idaho Operations Office, *Final Record of Decision Idaho Nuclear Technology and Engineering Center,* Operable Unit 3-13, Idaho National Engineering and Environmental Laboratory, DOE/ID-10660, Rev. 0, October 1999.

2. EDF 1540, "Waste Inventory Design Basis."

3. EDF 1542, "Stabilization and Treatment Process Selection."

4. EDF 1543, "Waste Transport Study."

5. EDF 1544, "Waste Verification and Statistical Analysis."

6. EDF-ER-226 Preliminary Hazard Catergorization of the INEEL Operable Unit 3-13 Waste Disposal Complex (Includes ICDF Landfill, Evaporation Pond and the SSSTF).

7. EDF 1546, "Preliminary Hazard Classification Analysis."

8. EDF 1547, "SSSTF/ICDF Operational Scenario and Process Flows."

9. EDF 1548, "Siting Study."

10. EDF 1549, "Evaporation Pond Waste Acceptance Criteria (WAC) Basis and Aqueous Waste."

11. EDF 1551, "Waste Acceptance Criteria."